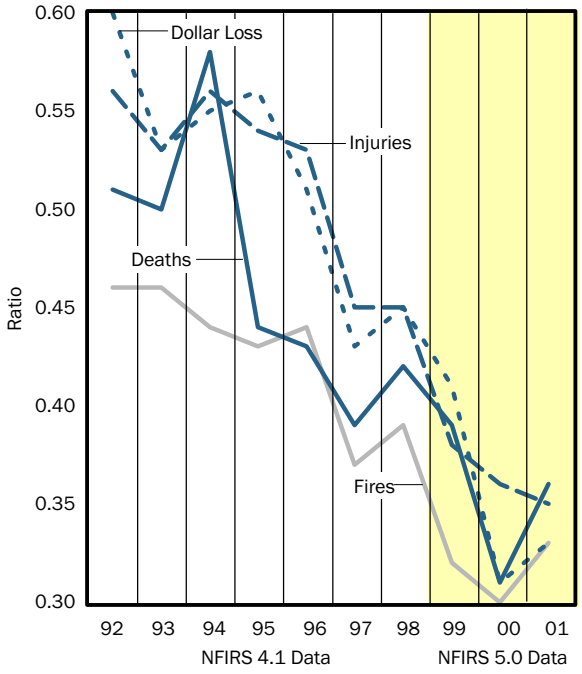
appendix A

Differences Between NFPA and NFIRS Estimates

The National Fire Incident Reporting System collects data from an average of 13,000 fire departments each year. The National Fire Protection Association's annual survey of fire departments[1] collects data from more than 3,000 fire departments. Neither is a perfect random sample; not all fire departments asked to participate do so. The distribution of fire departments is not the same in the two samples. And the NFPA survey collects tallied totals whereas NFIRS collects individual incident reports. Not surprisingly, therefore, there are differences between the NFPA annual survey results and the NFIRS results. In 9 of the 10 years examined (1992–2001), the deaths reported to NFIRS represent a larger fraction of the NFPA national estimate of deaths than the NFIRS number of fires is of the NFPA estimate of fires. NFIRS injuries and dollar loss are even larger fractions of the NFPA totals than are deaths or fires (Figure A-1).

Looking at the problem another way, Figure A-2 shows the number of deaths per fire, injuries per fire, and dollar loss per fire from NFIRS and NFPA from 1992 to 2001. Deaths per fire are similar for NFIRS and NFPA, with an average annual difference of 10 percent and a maximum

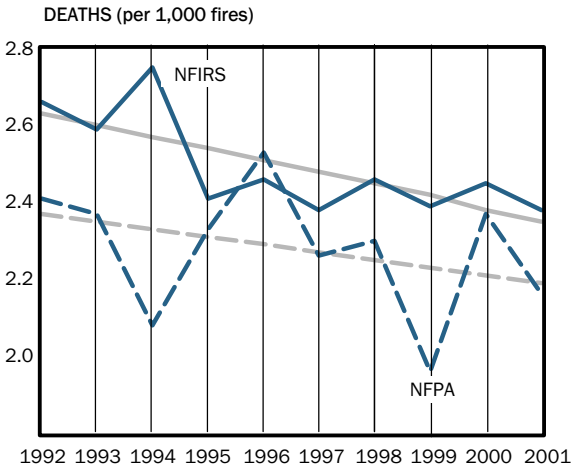


	Fires	Deaths	Injuries	Dollar Loss
1992	0.46	0.51	0.56	0.60
1993	0.46	0.50	0.53	0.53
1994	0.44	0.58	0.56	0.55
1995	0.43	0.44	0.54	0.56
1996	0.44	0.43	0.53	0.51
1997	0.37	0.39	0.45	0.43
1998	0.39	0.42	0.45	0.45
1999	0.32	0.39	0.38	0.41
2000	0.30	0.31	0.36	0.31
2001	0.33	0.36	0.35	0.33

Sources: NFPA and NFIRS

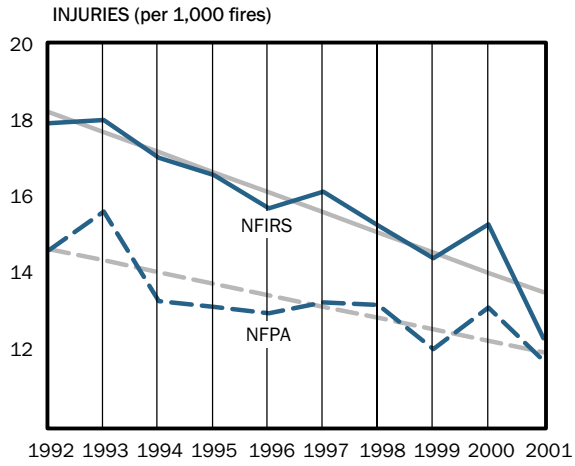
Figure A-1. Ratio of Raw NFIRS Sample to NFPA National Estimates

[1] "Fire Loss in the United States," *NFPA Journal*, generally the September/October issue each year.



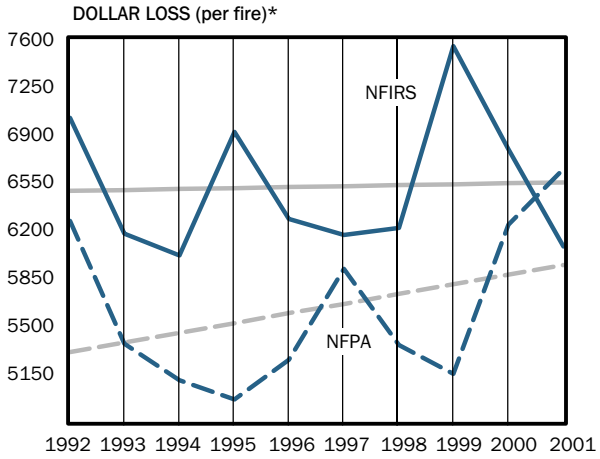
	NFIRS	NFPA
1992	2.66	2.41
1993	2.59	2.37
1994	2.75	2.08
1995	2.41	2.33
1996	2.46	2.53
1997	2.38	2.26
1998	2.46	2.30
1999	2.39	1.96
2000	2.45	2.37
2001	2.38	2.16

10-Year NFIRS Trend = –10.7%
10-Year NFPA Trend = –7.5%



	NFIRS	NFPA
1992	17.92	14.61
1993	18.01	15.61
1994	17.02	13.26
1995	16.57	13.11
1996	15.69	12.94
1997	16.14	13.23
1998	15.25	13.16
1999	14.38	12.00
2000	15.27	13.09
2001	12.29	11.70

10-Year NFIRS Trend = –26.0%
10-Year NFPA Trend = –18.5%



	NFIRS	NFPA
1992	$7,019	$6,266
1993	6,171	5,363
1994	6,012	5,098
1995	6,916	4,956
1996	6,280	5,248
1997	6,163	5,915
1998	6,215	5,358
1999	7,547	5,143
2000	6,769	6,239
2001	6,079	6,645

10-Year NFIRS Trend = +1.0%
10-Year NFPA Trend = +12.0%

*Adjusted to 2001 dollars

Sources: NFPA and NFIRS

Figure A-2. NFIRS vs. NFPA Survey: Losses Per Fire

difference of 32 percent in 1994. Injuries and dollar loss per fire are higher in the NFIRS sample than in the NFPA estimates by an average of 19 percent for injuries and 17 percent for dollar loss.

Other differences appear when reviewing losses by property type as shown in Figure A-3. Of interest is that the distribution of fires across property types between NFIRS and NFPA are quite similar with only small differences, which is quite reassuring. Over the 10-year period, the proportion of structure fires (both residential and non-residential) is virtually identical in the two sources. Vehicles are slightly more represented in the NFIRS sample; outside and other fires are slightly more represented in the NFPA estimate. Regardless of the specifics, the distributions are quite comparable.

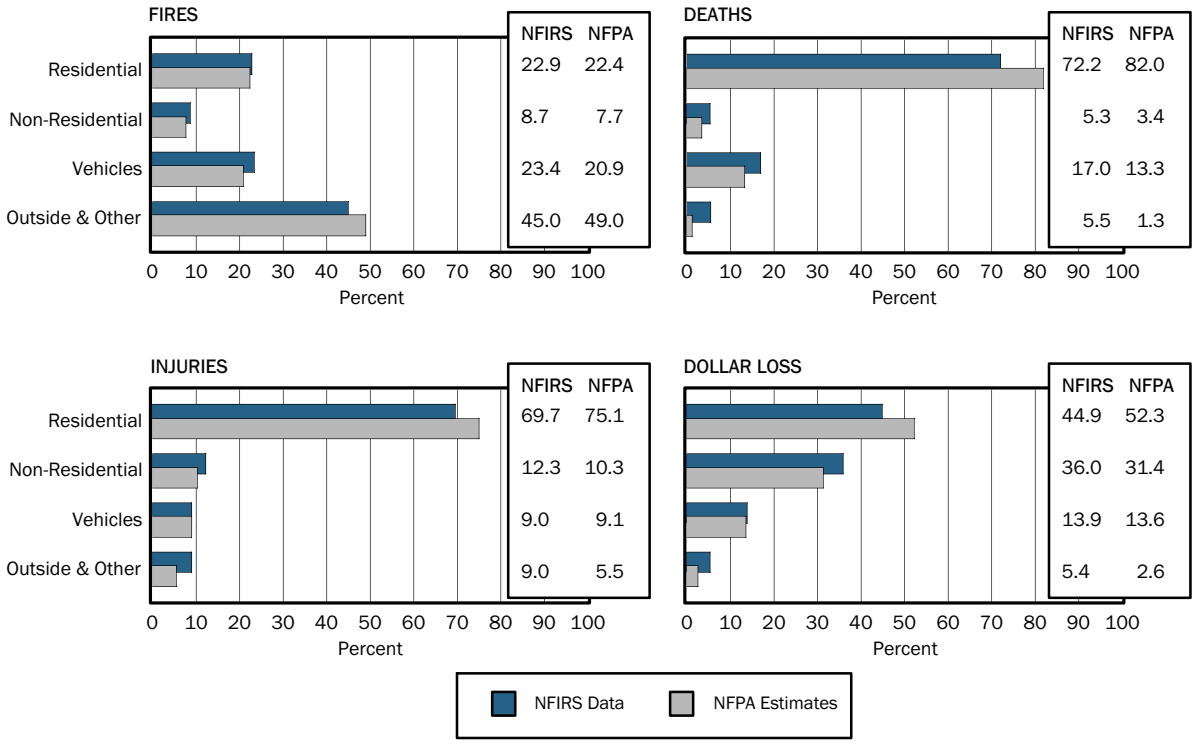


Figure A-3. Comparison of NFIRS Data With NFPA Estimates by General Property Type (10-year average)

But the deaths, injuries, and dollar losses that result from these fires are very different and are consistently more heavily represented in residential structures. The other major categories (except vehicular fire injuries) are consistently less for each of the loss measures.

One of the more important consequences of these distributions is in the creation of estimates of the various parts of the U.S. fire problem. For example, in Chapter 3, it is noted that NFPA residential estimates reflect 84 percent of fire deaths (3,140 of 3,745) and 77 percent of fire injuries (15,575 of 20,300). If USFA percentages for deaths (77 percent) and injuries

(73 percent) were applied to the overall NFPA estimates, as is the general case when creating estimates of the fire problem, the estimates would yield approximately 2,890 deaths and 14,880 injuries, both of which are substantially less.

The reasons for these differences are not known. It may be that some departments reporting summary data to NFPA inadvertently undercount their casualties and losses when reporting on the NFPA survey forms. Another possibility is that there are data entry errors in NFIRS, with larger numbers of deaths, injuries, and dollar loss creeping into the database despite edit checks at state and federal levels. (It appears that at least some of the dollar loss difference is due to this.)

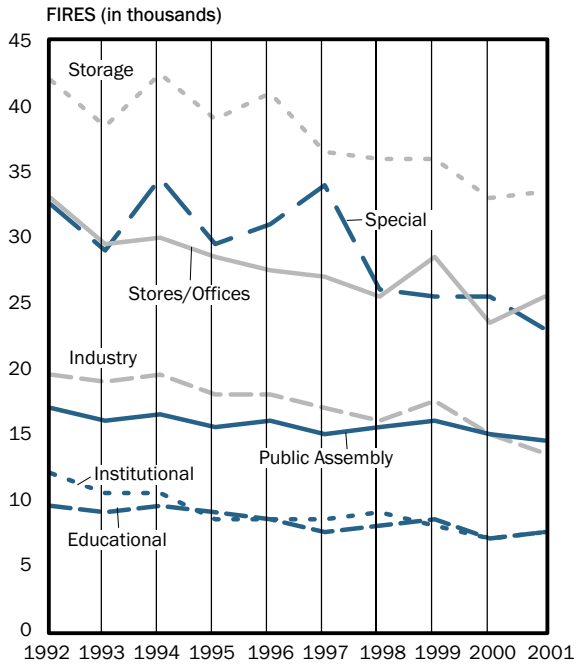
A third possibility for the differences is that fire departments might not report some minor fires to NFIRS that they include in their own totals that are reported to NFPA. It is known that, prior to the introduction of abbreviated reporting of small, no-loss confined fires, some departments did not fill out NFIRS forms for minor fires such as food on stoves or chimney fires. It is not clear whether these fires were or were not included in the department's report to NFPA nor the extent of the problem.

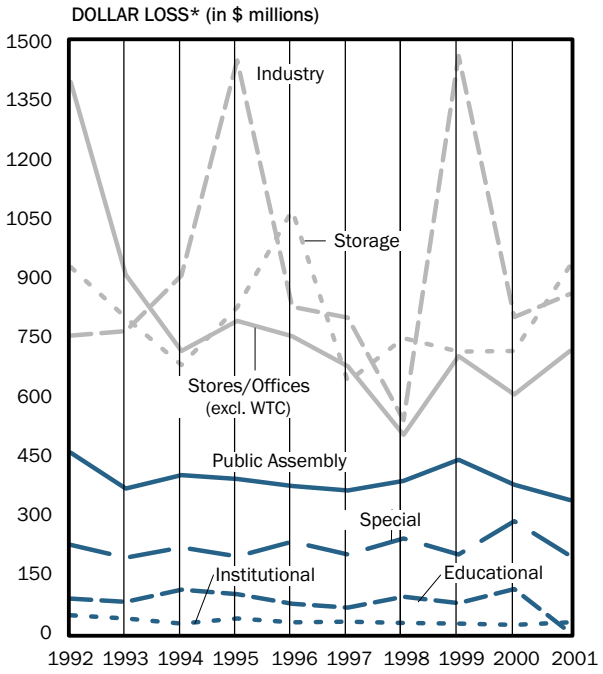
A fourth possibility is that some jurisdictions use NFIRS as a tracking system for fire casualty information without providing the related incident data. We know that this possibility does indeed occur from time to time in NFIRS. Again, we are unsure of how these deaths and their corresponding incidents are reported to NFPA.

Lastly, it could be that techniques used to generate the NFPA estimates unintentionally favor residential structures or that the NFIRS sample, because it is not a true random sample, may have a bias that results in fewer residential losses.

Resolving the differences between the two major sources of fire statistics in the United States is important to prevent confusion among users of the data.

Figure A-4 represents the NFPA survey trends for non-residential property fires and dollar loss.





Year	Public Assembly	Education	Institution	Stores/Offices	Industry	Storage	Special
1992	17,000	9,500	12,000	33,000	19,500	42,000	32,500
1993	16,000	9,000	10,500	29,500	19,000	38,500	29,000
1994	16,500	9,500	10,500	30,000	19,500	42,500	34,500
1995	15,500	9,000	8,500	28,500	18,000	39,000	29,500
1996	16,000	8,500	8,500	27,500	18,000	41,000	31,000
1997	15,000	7,500	8,500	27,000	17,000	36,500	34,000
1998	15,500	8,000	9,000	25,500	16,000	36,000	26,000
1999	16,000	85,00	8,000	28,500	17,500	36,000	25,500
2000	15,000	7,000	7,000	23,500	15,000	33,000	25,500
2001	14,500	7,500	7,500	25,500	13,500	33,500	23,000
				Dollar Loss* ($ millions)			
1992	$456	$ 86	$44	$1,395	$ 754	$ 927	$223
1993	365	78	37	908	764	798	191
1994	399	109	24	715	906	679	216
1995	390	98	36	791	1,450	825	194
1996	372	73	27	751	827	1,071	231
1997	361	64	28	675	798	637	199
1998	385	91	25	502	539	746	239
1999	438	75	24	701	1,462	713	199
2000	375	111	21	604	800	714	283
2001	(excl WTC) 336	170	27	715	858	930	195
2001	(incl. WTC) 336	170	27	34,155	858	930	195

*Adjusted to 2001 dollars

Source: NFPA

Figure A-4. Trends in NFPA Non-Residential Structure Fires and Dollar Loss by Property Type